

Business Computer Programming Competency Profile

This document provides instructors and administrators with links between the competencies and the Show-Me Standards for students in Missouri public schools and the *National Standards for Business Education*.

For the *National Standards for Business Education*, a numbering system has been developed as the originals used bulleted items. A sample numbered item is IT.IX.3-4.4, which means Information Technology, Roman Numeral IX, Level 3-4, the fourth bulleted item.

These suggested competencies, developed by an advisory committee, are intended to provide a basis for the curriculum for each course. Each list is neither inclusive nor entirely required. You may select competencies from this list, combine those with competencies from other lists, and develop competencies of your own to define the outcomes you expect your students to achieve. The Show-Me Standards identified provide guides. If activities you choose better align with other Standards, you should align your competencies/objectives with them instead of these.

| Competencies | Show-Me Standards | National Standards for Business Education * |
|--|-------------------|---|
| A. Explore Computer Concepts | | |
| 1. Trace the development of computers and their impact on society | 4.3, SC8 | IT.I.1.1 |
| 2. Describe the categories and evolution of programming languages | 1.9, CA6, MA4 | IT.IX.3-4.3 |
| 3. Explain the functions of computer hardware and architecture | 1.5, 2.1, CA6 | IT.XIII.3.1 |
| 4. Demonstrate an understanding of computer theory (e.g., bits, bytes, binary logic, memory, and storage) | 1.6, MA1, MA5 | |
| 5. Compare computer operating systems (e.g., DOS, Windows, and Unix) | 1.6, 2.4, CA6 | IT.III.2.2 |
| 6. Discuss legal/ethical issues related to computers | 4.3, 4.4, CA6 | |
| 7. Identify the application environment/interface for the specific language being covered (e.g., Windows, Macintosh, or DOS Based) | 1.6, CA6 | IT.III.2.2 |
| 8. Explain the concept of security and its relationship to programming | 1.5, 4.3, CA6 | IT.XVI.2.4 |
| 9. Manage the operating system on the workstation | 3.1, SC8 | IT.III.1.1 |
| 10. Explain the difference between a mainframe, midframe, server, and personal computer | 1.6, CA6 | IT.III.3-4.2 |
| B. Apply Logical Problem-Solving Skills | | |
| 1. Analyze a problem | 3.1, SC7 | |
| 2. Determine the steps needed to solve a problem | 3.6, SC7 | |
| 3. Create a method to solve a problem | 3.2, 3.3, SC7 | |
| 4. Illustrate the problem solution using a flowchart or pseudocode | 1.8, CA4 | IT.IX.3-4.5 |

| C. Describe the Software Development Life Cycle | | |
|--|--------------------|---------------------------|
| 1. Explain how requirements for a new program are gathered | 3.4, CA6 | IT.X.4.1 |
| 2. Explain how to analyze the requirements for a new program | 3.4, CA6 | IT.X.4.1 |
| 3. Explain how to create a flowchart or pseudocode for a new program | 3.4, CA6 | IT.X.4.1 |
| 4. Explain how to use a flowchart or pseudocode in coding the modules of a new program | 3.4, CA6 | IT.X.4.1 |
| 5. Explain how to integrate the modules of a new program | 3.4, CA6 | IT.X.4.1 |
| 6. Explain how a new program is authorized/accepted | 3.4, CA6 | IT.X.4.1 |
| 7. Explain how to maintain a program | 3.4, CA6 | IT.X.4.1 |
| D. Develop Program Applications | | |
| 1. Use correct syntax of a given programming language | 2.2, CA4 | IT.IX.3-4.4 |
| 2. Create a program using internal documentation | 4.1, CA4 | IT.IX.3-4.4, IT.X.4.10 |
| 3. Create a program using variables and constants | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 4. Create a program using counters and accumulators | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 5. Create a program using arithmetic operations and functions | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 6. Create a program using a conditional statement | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 7. Create a program using a loop instruction | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 8. Create a program that requires user input | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 9. Create a program that includes input validation | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 10. Create a program to open, write, and read from a data file | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 11. Create a program to produce a report | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 12. Create a modular program using one or more subroutines | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 13. Create a program using one- and two- dimensional arrays | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 14. Create a program using a sort routine | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 15. Create a program with a standard Windows graphic user interface (GUI) with objects and menus | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 16. Create a program with a custom GUI | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 17. Create an object-oriented program by creating objects and classes | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 18. Create a program to display graphics | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 19. Create a program to animate graphic objects | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 20. Create a program using multimedia | 3.4, 3.7, CA4 | IT.IX.3-4.4 |
| 21. Create a program and supporting external documentation | 3.4, 3.7, 4.1, CA4 | IT.IX.3-4.4, IT.X.4.10 |
| 22. Modify an existing program | 3.4, 3.7, 3.8, CA4 | IT.IX.3-4.7 |
| 23. Create a program in collaboration with a team | 3.4, 3.7, 4.6, CA4 | IT.IX.3-4.4 |

| E. Explore Additional Programming Concepts | | |
|--|----------------------------|-----------------------------|
| 1. Describe steps involved in troubleshooting and debugging | 1.2, SC7 | IT.IX.3-4.11 |
| 2. Discuss considerations in programming for efficiency (e.g., computer time, programmer time, etc.) | 3.8, CA6 | |
| 3. Discuss how to create a user-friendly program | 1.8, 1.10, CA6 | IT.XIII.4.1 |
| 4. Describe event-driven programming | 3.7, CA6 | |
| 5. Describe error catching/handling | 3.7, CA6 | |
| 6. Compare object-oriented programming with structured programming | 1.6, 3.7, CA6 | IT.IX.3-4.6 |
| 7. Describe how the Internet uses programming | 3.4, CA6 | |
| 8. Explain uses of scripting languages | 3.7, CA6 | IT.IX.3-4.10 |
| 9. Discuss handicap accessibility considerations in programming | 3.4, CA6 | IT.XIII.4.1 |
| F. Apply Database Concepts | | |
| 1. Create file structures | 3.2, 3.3, CA4 | |
| 2. Describe database structures (e.g., fields, records, files, and tables) | 1.6, CA6 | IT.VIII.3.4, IT.VIII.4.1 |
| 3. Create a database file with one or more tables for manipulation by program code | 1.4, CA4 | IT.VIII.4.2 |
| 4. Create a database file with one or more tables via text editor, database software, and/or source code | 1.4, CA4 | IT.VIII.4.2 |
| 5. Write code to append, delete, and update a table or a file | 1.4, 3.4, CA4 | IT.IX.3-4.9 |
| 6. Write code to integrate a database with another application | 1.4, 3.4, CA4 | IT.VIII.4.5 |
| 7. Create a relational database application | 1.4, 3.4, CA4 | IT.VIII.4.9 |
| 8. Write code to search, sort, and query a database | 1.4, 3.4, CA4 | IT.VIII.3.3 |
| G. Prepare for Employment | | |
| 1. Demonstrate working as a team | 4.6, CA6 | |
| 2. Demonstrate analytical skills | 3.5, SC7 | |
| 3. Search the Internet and other places to locate career-planning information and job opportunities related to programming | 2.6, 4.8, CA6 | IT.XVII.2.1 |
| 4. Identify careers in the information technology field | 2.6, 4.8, CA6 | IT.XVII.3-4.1 |
| 5. Demonstrate communication skills | 2.1, 2.2, 2.3, CA1, CA6 | IT.XIV.3.1 |
| 6. Demonstrate logical thinking | 3.5, SC7 | |
| 7. Demonstrate interpersonal skills | 4.4, 4.6, CA6 | |
| 8. Explore compatibility for programming | 4.3, SC7 | IT.XVII.3-4.3 |

* National Standards for Business Education (Key)

A – Accounting
 BL – Business Law
 CD – Career Development
 C – Communication
 CO – Computation
 E – Economics

PF – Personal Finance
 EN – Entrepreneurship
 IT – Information Technology
 IB – International Business
 M – Management
 MKT – Marketing